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Measuring Commercial Bank Efficiency

Use and Misuse of Bank Operating Ratios

Dimitri Vittas

Measuring bank efficiency is difficult because there is no satisfactory definition of bank output. International comparisons based on operating costs and margins are fraught with problems. These stem from substantial differences in capital structure (leverage), business or product mix, range and quality of services, inflation rates, and accounting conventions (especially about the valuation of assets, the level of loan loss provisioning, and the use of hidden reserves). Facile and uncritical use of ratios cannot substitute for detailed knowledge and understanding of banking structure and practice.

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Measuring bank efficiency is difficult because there is no satisfactory definition of bank output. Neither the number of accounts nor total assets, total loans, and total deposits provide a good index of output. Moreover, the value added of banks — given by their labor costs and profits — measures both the output and the cost of banking.

Many analysts use accounting data on bank margins, costs, and profits as measures of bank efficiency. But the usefulness of these data is undermined by substantial structural and accounting differences across countries, among individual banks, and over time. Great caution and extensive knowledge of local banking conditions are required to interpret bank ratios.

Vittas uses three sets of operating ratios to discuss the impact of differences in structure and practice on bank performance:

- Operating asset ratios (which relate all revenues and costs to average assets).

- Operating income ratios (which relate revenues and costs to gross income).

- Operating equity ratios (which relate revenues and costs to average equity).

He also uses return-on-equity (ROE) analysis to highlight the effects of differences in banking structure and practice. ROE analysis combines two simple identities between profitability ratios, bank leverage, and gross margins. It copes quite well with the differential impact of capital structure, product mix, and inflation but not with differences in accounting conventions. ROE analysis can also shed light on the relationship between spreads, leverage, and inflation.

Vittas applies his analysis to the performance of banks in OECD countries in the 1980s. He shows that U.K. building societies, German savings banks, and commercial banks in Canada, Germany, and the Netherlands were highly profitable and efficient. American money center banks and foreign banks in Canada were the least profitable.

The data also suggest that banks in consolidated banking systems with high concentration, as in Canada, the Netherlands, and Sweden, have lower operating costs than banks in fragmented systems, as in Italy, Norway, and the United States.

The analysis has major implications for assessing bank performance in developing countries. Given the narrower range and lower quality of their services and the lower level of wages, their cost-asset and cost-income ratios should be smaller than for banks in developed countries. But inflation, higher risk, and operating inefficiencies often cause cost and other bank ratios to be generally higher than in OECD countries.

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I. INTRODUCTION

A major plank of programs of banking and financial reform in developing countries is the improvement in bank efficiency that may result from exposing domestic institutions and markets to greater competition. A basic benefit of enhanced efficiency is a reduction in spreads between lending and deposit rates. This is likely to stimulate both greater loan demand for industrial investment (and thus contribute to higher economic growth) and greater mobilization of financial savings through the banking system.

Banks in developing countries operate with relatively wide spreads. These are caused by government policies and regulations and by operating inefficiencies. For instance, a wedge between loan and deposit rates, at least for the nonprivileged customers of banks, is created by the imposition of onerous reserve requirements and other forms of bank taxation, the operation of directed credit programs and a high level of inflation. In addition, high operating costs, large loan losses and large profits from uncompetitive behavior are also translated into wide bank spreads.

An issue that confronts policymakers of developing countries is how to measure improvements in bank efficiency. One way is to collect detailed data on bank spreads before and after the reform. Another is to undertake a detailed comparative study of spreads in different countries. Both of these approaches are quite laborious, because banks offer a wide range of loans and deposits as well as other types of services. A careful identification of bank products and services and a compilation of detailed data on interest rates and other fees would be required, while the findings may still be inconclusive if spreads for specific products exhibit variations from country to country that have no systematic pattern.

An alternative approach is to use some aggregate index of bank efficiency. However, constructing such an aggregate index is subject to great difficulties. The most basic problem is the lack of a satisfactory definition of bank output. Most econometric studies of banking (for instance, in the extensive literature on bank economies of scale and scope) use either total assets, loans or deposits or the number of accounts as an index of bank output even though none of these variables is able to capture the value of service provided by banks.

A better alternative is perhaps a measure of the value added of banks, which is given by the labor costs and profits of banks. However, value added also measures the total cost of banking. While it may give a better indication of the size of the banking industry than either the number of loan accounts or the value of loan balances outstanding, it does not provide a satisfactory measure of bank efficiency. Value added may be as high for

banking systems that provide a wide range of services at low cost as for banking systems that offer a narrow range at high cost.

To obtain a good measure of bank efficiency it would be necessary to construct an independent index of bank output or at least an index of bank prices that could then be used to obtain a measure of bank output. Such a measure could then be combined with data on bank costs to ascertain the relative efficiency of different banking systems or individual banks.

Unfortunately, such independent measures of bank prices and output are not generally available. Moreover, even if they were available, an important policy issue would still remain unresolved. It would still be possible for one banking system to offer a narrow range of services at low unit cost and for another to offer a wider range of services at higher unit cost. While the latter might be less efficient in terms of unit costs, its total economic contribution could be higher than the former system if the provision of a wider range of services reduced the transaction and information costs of other economic agents and led to a more efficient mobilization and allocation of resources by the economy as a whole.

Faced with these difficulties, most analysts resort to the use of accounting data on bank margins, costs and profits as measures of bank efficiency. Three types of operating ratios may be used in analyzing the performance of banks: operating asset ratios, operating income ratios and operating equity ratios. The first relate all revenues and costs to average total assets, the second to gross income and the third to average equity.

Although they are more readily available and widely used, the usefulness of operating ratios is undermined by differences in capital structure, business mix, and accounting practices across countries, among individual banks, and over time. Operating ratios are also affected by variations in inflation rates.

Differences in capital structure refer to differences in the equity capitalization ratio of different banks, i.e. the ratio of average equity capital to average total assets: banks with a higher equity will generally report higher operating ratios, such as interest and gross income margins and return on assets (ROA) and lower cost/income ratios, than banks with a lower equity, even though the basic interest spreads of the two banks may be the same.

Differences in business mix derive from differing combinations of high and low margin business, while accounting practices that distort operating ratios cover such issues as the valuation of assets, the treatment of reserves for depreciation, pensions, and loan losses, and the use of hidden reserves. The impact of inflation also varies depending on the capital structure, business mix and accounting conventions of banks in different countries.

The remainder of this paper is devoted to a critical examination of traditional measures of bank efficiency such as bank margins, costs and profits. A fundamental point of the paper is that interpreting and using data on bank margins, costs and profits requires great caution and detailed knowledge of the operating characteristics of different banks.

The paper also emphasizes the fact that different ratios have their merits and demerits and that a combination of ratios from each type may provide a better, though still not fully satisfactory, indication of efficiency. Particular emphasis is placed on ROE (return on equity) analysis that underscores the links between different profitability ratios, leverage and product mix. ROE analysis can also be used to shed light on the relationship between bank spreads, leverage and inflation.

The next section of the paper provides an analytical discussion of the factors that influence bank margins, while the third section reviews the experience of banking systems in some OECD countries. The paper concludes with a discussion of some analytical and policy issues.

II. DETERMINANTS OF OPERATING RATIOS

2.1 Operating Ratios of Stylized OECD Bank

Table 1 shows the operating ratios of a stylized bank that would broadly correspond to the average bank in OECD countries. Bank A has a loan portfolio that represents 60% of its total assets. It also invests 25% of assets in securities and interbank claims that yield money market rates. The remaining 15% of assets are non-interest-earning, 5% in fixed assets and trade investments that may appreciate in nominal or real value terms and 10% in assets that have a fixed nominal value. On the liabilities side, Bank A is assumed to have 15% of liabilities in demand deposits and other items that pay no interest, 60% in interest-bearing depcsits, 20% in borrowed funds that pay money market rates, and 5% in equity. The spread between loan and deposit rates is 4%. The rates of interest on various instruments are as indicated in Table 1. The rates implicitly assume an inflation rate of 5%. Noninterest income amounts to 0.75% of assets and noninterest expenses (including both operating costs and provisions) to 2.6% of assets.

Table 1

Stylized Bank Operating Ratios

Bank A

Assets			Liabilities		
Loans	60	11%	Demand deposits	10	0%
Securities	15	9%	Other deposits	60	7%
Interbank	10	9%	Borrowed funds	20	9%
Fixed assets	5	0%	Other liabilities	5	0%
Other assets	10	0%	Equity	5	0%
Total	100	8.85%	Total	100	6.00

Operating Ratios

	OAR	OIR	OER
Interest margin	2.85	79.2	57.0
Noninterest income	0.75	20.8	15.0
Gross income	3.60	100.0	72.0
Noninterest expenses	2.60	72.2	52.0
Net income	1.00	27.8	20.0

On the basis of these assumptions, Bank A has the following operating asset ratios (OAR): an interest margin of 2.85%, a gross income margin of 3.6% and a ROA of 1%. (It should be noted that the interest spread of 4% is reduced to an average interest margin of 2.85%). Its operating income ratios (OIR) show that Bank A generates 20.8% of its gross income through non-interest fees, while its cost/income ratio is 72.2%. The operating equity ratios (OER) show a ROE of 20%. But they also show a gross income to equity ratio of 72% and a cost to equity ratio of 52%. These last two ratios provide an indication of the extent to which Bank A may be over- or under-trading by comparison to other banks.

The ROE of 20% is, of course, expressed in nominal terms. Allowing for inflation, this would fall to 15%, although a correct calculation of the ROE under inflation should also take account of the revaluation gains of fixed assets and trade investments. Prevailing accounting practice does not include revaluation gains in annual profit calculations, though this may be very misleading not only in countries suffering from high inflation but also in countries with low but persistent inflation.

The study of bank performance and efficiency would present few difficulties if all banks had the same capital structure, offered the same mix of services, followed identical accounting practices, were equally affected by inflation and operated under the same regulatory restrictions. Under these circumstances, a simple comparison of interest margins, cost ratios and rates of return would provide a clear indication of relative efficiency even in the absence of a satisfactory definition of bank output.

However, banks exhibit considerable differences in their capital structure, their business mix and their accounting practices. Banks also operate in substantially different macroeconomic and regulatory environments. These differences have a large impact on their operating ratios and cast serious doubt on the usefulness of facile comparisons based on ROAs, interest and gross income margins, and cost/income ratios. Moreover, the accounting data, on which all types of operating ratios are based, suffer from many qualitative problems that seriously undermine the usefulness of these ratios for analytical and policy purposes.

2.2 Capital Structure

Most financial analysts focus on the return to assets (ROA) ratio as a measure of bank efficiency without paying adequate attention to the impact of differences in the equity capitalization ratio of different banks.

A bank with a higher equity capital will report a higher ROA than a bank with a lower equity capital, even if all other spreads and costs are the same. Table 2 shows the impact of capital structure on various operating ratios. It assumes two banks that have identical asset and liability structures as well as noninterest incomes and expenses as Bank A, except for their equity capital and borrowed funds.

Bank B has an equity capital of 7.5% and reports a higher ROA of 1.22% but a lower ROE of 16.2%. In contrast, Bank C has an equity capital of 2.5% and reports a lower ROA of 0.77% but a higher ROE of 30.8%.

In general, and as already noted above, a higher equity capital increases most operating asset ratios, such as the interest margin, gross income margin and ROA, but lowers operating income ratios (such as the share of noninterest income and the cost/income ratio) and operating equity ratios. The reason for this is very simple. A bank with a higher equity capital needs to borrow less in order to support a given level of assets. As a result its interest expenses are lower and this causes the interest margin to be higher. This is then reflected in a higher gross income to assets ratio. If costs and provisions are unaffected by the higher level of equity, the result is a higher net income

Table 2

The Impact of Capital Structure

Bank B

High Equity Capital - Low Leverage

Assets			Liabilities		
Loans	60	11%	Demand deposits	10	0%
Securities	15	9%	Other deposits	60	7%
Interbank claims	10	9%	Borrowed funds	17.5	9%
Fixed assets	5	0%	Other liabilities	5	0%
Other assets	10	0%	Equity	7.5	0%
Total	100	8.85%	Total	100	5.78%

Operating Ratios

	OAR	OIR	OER
Interest margin	3.07	80.4	40.9
Noninterest income	0.75	19.6	10.0
Gross income	3.82	100.0	50.9
Noninterest expenses	2.60	68.1	34.7
Net income	1.22	31.9	16.3

Bank C

Low Equity Capital - High Leverage

Assets			Liabilities		
Loans	60	11%	Demand deposits	10	0%
Securities	15	9%	Other deposits	60	7%
Interbank claims	10	9%	Borrowed funds	22.5	9%
Fixed assets	5	0%	Other liabilities	5	0%
Other assets	10	0%	Equity	2.5	0%
Total	100	8.85%	Total	100	6.23%

Operating Ratios

	OAR	OIR	OER
Interest margin	2.62	77.7	104.8
Noninterest income	0.75	22.3	30.0
Gross income	3.37	100.0	134.8
Noninterest expenses	2.60	77.2	104.0
Net income	0.77	22.8	30.8

and lower cost/income ratios. Its operating equity ratios are lower because it has a higher equity base. In Table 2, Bank B shows a lower ROE as well as lower gross income and costs to equity ratios, implying that it is undertrading compared to both Bank A and Bank C.

These ratios result from the assumption that bank spreads and operating costs, including loss provisions, are the same for all three banks, irrespective of their different capital structures. They reflect the well known advantages of higher leverage, although they disregard the greater risks normally associated with higher leverage. In principle, however, one would expect a bank with a lower capital to be more risky and therefore to be faced with a higher cost of funds. But irrespective of whether or not the cost of funds adjusts for the higher risk of more leveraged banks, the fact remains that for Bank B to have the same ROE as Bank A it would need to operate with much higher spreads and margins. In the example of Table 2, Bank B would need a ROA of 1.5% in order to earn a ROE of 20%. This would imply an interest margin of 3.35 (instead of 2.85%) and a gross income margin of 4.1% (instead of 3.6%). Conversely, Bank C could operate with a ROA of only 0.5% and still earn a 20% ROE. This would imply an interest margin of 2.35% and a gross income margin of 3.1%.

Data for different types of American banks show that their equity capitalization ratios range from 4.6% for the money center banks to 8.2% for small local banks. Also, data for commercial banks in different OECD countries show that equity capitalization ratios varied on average over the 1980-86 period from 7.9% for Spanish banks and 7.1% for Finnish banks to as low as 1.4% for Swedish banks and 2.4% for French and Japanese banks. Thus, differences in the equity capital of banks can be substantial and need to be borne in mind in analyzing the performance of banks across countries or even within a given country.

2.3 Business or Product Mix

The second factor that can influence bank ratios are differences in business or product mix. Table 3 provides an illustration of two banks with substantial differences in business mix. The example assumes three types of loans and two types of interest-bearing deposits. Bank D has a greater involvement in retail banking which is associated with higher loan rates, lower deposit rates and higher operating costs. Bank E specializes in wholesale corporate banking. Both banks are assumed to generate the same amount of fee income and to have the same capital structure.

The example of Table 3 is constructed in a way that illustrates that two banks can have the same ROAs and ROEs, even though their interest margins, gross income margins and operating cost ratios are widely different. Any conclusion that the bank with lower margins and cost ratios (Bank E) is more efficient would be totally unwarranted. In fact, by assumption, both banks charge the same rates of interest on loans to the same types of customers and also pay the same rates on similar deposits.

Many analysts looking at the low margins either of Japanese banks or of the UK building societies postulate that these institutions are more efficient than the large

Table 3

The Impact of Business Mix

Bank D

Retail Product Mix - High Margins

Assets			Liabilities		
Retail Loans	20	14%	Demand deposits	10	0%
Small business	20	12%	Retail deposits	40	4%
Large corporate	20	10%	Wholesale deposits	30	8%
Securities	15	9%	Borrowed funds	10	9%
Interbank claims	10	9%	Other liabilities	5	0%
Fixed assets	5	0%	Equity	5	0%
Other assets	10	0%			
Total	100	9.45%	Total	100	4.90%

Operating Ratios

	OAR	OIR	OER
Interest margin	4.55	85.8	91.0
Noninterest income	0.75	14.2	15.0
Gross income	5.30	100.0	106.0
Noninterest expenses	4.30	81.1	86.0
Net income	1.00	18.9	20.0

Bank E

Wholesale Product Mix - Low Margins

Assets			Liabilities		
Loans	60	10%	Demand deposits	5	0%
Securities	15	9%	Other deposits	65	8%
Interbank claims	10	9%	Borrowed funds	20	9%
Fixed assets	5	0%	Other liabilities	5	0%
Other assets	10	0%	Equity	5	0%
Total	100	8.25%	Total	100	7.00%

Operating Ratios

	OAR	OIR	OER
Interest margin	1.25	62.5	25.0
Noninterest income	0.75	37.5	15.0
Gross income	2.00	100.0	40.0
Noninterest expenses	1.00	50.0	20.0
Net income	1.00	50.0	20.0

American and British commercial banks that generally exhibit much higher operating margins. But this disregards the fact that high margin business involves high operating costs - for instance smaller loans are more expensive to process and monitor, while smaller deposits require a bigger branch network to collect and service.

Moreover, banks that offer a wider range of services, including payment products and investment banking services, will have much higher operating costs than banks that confine themselves to specialized areas of deposit and lending business. But banks offering a wider range of services also have a greater opportunity to generate noninterest fees. Investment and merchant banks have traditionally relied on noninterest fees for their services in trade and corporate finance, including mergers and acquisitions. The advent of securitization in recent years has also contributed to an increase in fee income.

Securitization represents a new direction in product mix that may explain, at least partly, the upward trend in interest and gross income margins and operating cost ratios of American commercial banks. A bank that securitizes the loans it originates will post a big increase in both its noninterest fee and operating cost ratios compared to a bank that retains its loans and includes the interest spread in its interest margin. To the extent that business is non-asset based, operating ratios will be higher without necessarily implying lower efficiency.

A further way in which differences in business mix may affect operating ratios is through differences in interest mismatch. Banks that extend fixed rate term loans on the basis of short-term deposits assume a greater interest rate exposure than banks that specialize in short-term credits funded with short-term deposits or those that fund fixed rate term loans with fixed rate term deposits. Thus, even if they operate with similar spreads, banks with a greater interest mismatch will generally show lower margins when interest rates are rising and higher margins when interest rates are falling than banks with a smaller or no mismatch[1].

2.4 Range and Quality of Services

An important consideration in assessing bank efficiency is the range and quality of services offered to both corporate and individual customers. Banks that offer a limited range of services, operate a small number of branches, do not use computerized facilities and rely on labor-intensive and slow processing methods will tend to have low operating costs. However, despite their low operating cost ratios, it does not require much

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[1] This assumes that mismatched banks have more interest-sensitive deposits than loans. If the reverse occurs, i.e. if banks have more interest-sensitive loans than deposits, then their margins will be lower when interest are falling and higher when they are rising. This was the case for the large UK clearing banks in the 1970s and early 1980s when they were funding variable-rate loans with non-interest bearing (and therefore fixed-rate) deposits. The advent of interest-bearing demand deposits in the late 1980s has put an end to this kind of mismatch.

imagination to see that their efficiency leaves much to be desired. In effect, such banks transfer the operating costs of banking to their customers.

A recent World Bank mission to Romania highlighted the low quality of service offered by the Romanian savings bank. The savings bank has 26 million accounts which are mostly handled manually and/or mechanically rather than by computerized systems. Because of this, interest rates are changed at very infrequent intervals. This labor-intensive system of record keeping causes long delays in transaction processing with long and slow moving lines. Provisional data included in the report show that the operating costs of the Romanian savings bank were less than 0.17% of its total assets (World Bank, 1990b).

In contrast, banks that offer a wide range of services, operate large branch networks and invest heavily in computer facilities and electronic processing in order to enhance the quality of their services will tend to incur larger costs and will thus report higher operating cost ratios than banks with a limited range and low quality of services.

Thus, differences in the range and quality of service must be borne in mind in comparing the performance of banks and other deposit institutions, especially when comparing banks from developed and developing countries. As a rule, banks in developing countries offer a much narrower range of generally lower quality services. Given their lower labor costs one would expect bank operating costs to be lower in developing countries. The fact that banks in very few developing countries have operating costs that are lower than those of banks in most developed countries suggests that developing country banks suffer from operating inefficiencies such as overstaffing and uneconomic branching[2].

2.5 The Impact of Inflation

Apart from capital structure and business mix, differences in accounting practices can have a big impact on operating ratios. Four aspects of accounting difference will be discussed in this paper: the treatment and impact of inflation, the valuation of assets and liabilities, the level of provisioning and the use of hidden reserves.

The impact of inflation is a very complex issue that depends on the treatment of revaluation gains on the fixed assets and trade investments of banks as well as on changes in business mix caused by the response of economic agents to inflation. The

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[2] Many economists argue that developing countries suffer from bank overbranching. The evidence produced for such claims is not, however, very convincing since branch densities in developing countries are usually a fraction of those found in developed countries. But banks may suffer from uneconomic branching even if overall branch densities are low. Uneconomic branching implies that banks are forced to operate unprofitable branches and are not allowed to change their interest rates and service charges to enhance the overall profitability of their branch networks or to close down uneconomic branches.

Table 4

The Impact of Inflation

Bank F

No "Free Equity" - Inflation Gains

Assets			Liabilities		
Loans	60	26%	Demand deposits	10	0%
Securities	15	24%	Other deposits	60	22%
Interbank	10	24%	Borrowed funds	20	24%
Fixed assets	5	0%	Other liabilities	5	0%
Other assets	10	0%	Equity	5	0%
Total	100	21.6%	Total	100	18.0%

Operating Ratios

	OAR	OIR	OER
Interest margin	3.60	82.8	72.0
Noninterest income	0.75	17.2	15.0
Gross income	4.35	100.0	87.0
Noninterest expenses	2.60	59.8	52.0
Net income	1.75	40.2	35.0
Revaluation gains	1.00	23.0	20.0
Total income and gains	2.75	63.2	55.0
Monetary correction	1.00	23.0	20.0
Adjusted net income	1.75	40.2	35.0

Bank G

No "Free Equity" - Inflation Losses

Assets			Liabilities		
Loans	60	26%	Demand deposits	5	0%
Securities	15	24%	Other deposits	65	22%
Interbank	10	24%	Borrowed funds	20	24%
Fixed assets	5	0%	Other liabilities	5	0%
Other assets	10	0%	Equity	5	0%
Total	100	21.6%	Total	100	19.1%

Operating Ratios

	OAR	OIR	OER
Interest margin	2.50	76.9	50.0
Noninterest income	0.75	23.1	15.0
Gross income	3.25	100.0	65.0
Noninterest expenses	2.60	80.0	52.0
Net income	0.65	20.0	13.0
Revaluation gains	1.00	30.8	20.0
Total income and gains	1.65	50.8	33.0
Monetary correction	1.00	30.8	20.0
Adjusted net income	0.65	20.0	13.0

latter depends on the extent to which interest rates and other bank charges adjust to inflation.

Banks would generally benefit from inflation if they have demand deposits that pay zero interest, provided customers are slow in switching into interest-bearing instruments. On the other hand, banks would lose from inflation to the extent that they have "free equity", i.e. to the extent that their equity capital exceeds their fixed assets and trade investments and is therefore invested in loans. "Free equity" is sometimes called "financial capital" or "net monetary working capital".

As already noted, the data in Table 1 for Bank A are broadly based on the average bank in the average OECD country and assume an inflation rate of 5%. Bank A has noninterest liabilities, including equity, equal to 20%, while its noninterest earning assets are equal to 15%. Because its equity is equal to its fixed assets, Bank A has no "free equity" and as long as the value of fixed assets increases with inflation and the structure of its assets and liabilities does not change, its real ROE will be equal to its nominal ROE of 20%. This is because the revaluation gains on its fixed assets would not allow an erosion of the real value of its equity.

But a bank could still benefit from inflation if its noninterest-bearing liabilities exceed its noninterest-earning assets. Table 4 shows the balance sheet structure and operating ratios of Bank F, which is assumed to operate in a country with a 20% rate of inflation. It can be seen that its interest and gross margins are significantly higher than for Bank A and its reported ROA and ROE are 1.75% and 35% respectively. Because it is assumed that it has no "free equity", these are also its real ROA and ROE.

The results of Bank F depend crucially on the assumption that its structure of assets and liabilities has not changed even though inflation accelerates from 5% to 20%. However, under high inflation, bank customers will try to economize on their noninterest-bearing demand deposits and switch their funds to other types of deposits, while banks may start offering cash management and money market accounts. In countries, with no interest rate controls, banks may also start paying interest on demand deposits at a reasonable spread below time and savings deposits. If one assumes that half of demand deposits are transferred to time deposits, then banks would lose substantially from inflation. The lower half of Table 4 shows Bank G with a less favorable deposit structure. Its ROA falls to 0.65% and its ROE to 13%.

Inflation may cause an increased use of banking services if customers make more frequent bank visits to transfer funds across different accounts. This would cause a rise in operating costs that banks would try to recoup by levying transaction fees. But inflation can have an even bigger impact on operating ratios and bank profitability if it involves asset disintermediation and demonetization. Under such circumstances, banks would suffer a loss of deposit and loan business but continue, for a while at least, to operate large branch networks and staff. Their equity capitalization ratios would increase because their financial assets and liabilities would decline in real terms but their fixed assets would maintain their real value. The impact on operating ratios would depend on the net effect of inflation on their business mix, capital structure and noninterest revenues and expenses.

The impact of inflation would also be greater if banks have "free equity", the value of which is not hedged against inflation. Thus, in the examples of Table 4, if banks F and G have fixed assets equivalent to 2.5% of total assets, then the gains from revaluing fixed assets would add only 50 basis points to income. The real ROA, profit ratio and ROE of Bank F would fall to 1.25%, 2Ε 7% and 25% respectively, while those of Bank G would fall to 0.15%, 4.6% and 3%. Thus, the combination of inflation losses from changes in product mix with the erosion of the value of "free equity" can have a devastating effect on operating ratios and bank profitability.

2.6 Asset Valuation

There are many problems with the valuation of assets that affect banks in all countries. For instance, the use of book rather than market values for instruments that are readily traded, such as government securities, can distort trading incentives that may give rise to misleading operating results. Thus, banks with weak capital and profitability would have an incentive to retain all securities that suffer a capital loss and sell all those that show a significant capital gain. By including the gains in their income statement, even as a nonrecurrent item, they would increase their equity capital. In this way, both bank profitability and equity capital may be artificially boosted while the quality of assets on the balance sheet may deteriorate[3].

The above policy of overstating profits and bank capital would be followed in countries where banks are under regulatory pressure to boost their capital ratios. In contrast, in cases where bank capital is strong, banks may follow the opposite policy of selling depreciating securities to reduce their tax liabilities, while keeping appreciating ones in their balance sheets as a source of hidden strength.

Another way in which accounting policies may affect the true financial position of banks is through the undervaluation of assets due to a failure to adjust asset values to their replacement cost. This approach would also tend to reduce depreciation charges and would thus result in an overstatement of profits and an understatement of capital, so that profit ratios (ROEs) may be overstated on two counts.

On the other hand, accounting systems that allow banks to report depreciation and other reserves (for loan losses, pensions, etc) as liabilities rather than as asset offsets will tend to overstate total assets. The impact on operating asset ratios will then depend on the nature of the reserves that are reported as other liabilities. If the reserves mainly cover depreciation provisions, then both other assets and other liabilities will be overstated and operating asset ratios will be reduced. Especially, interest and gross income margins as well as operating cost ratios will be lower. However, operating income and equity ratios will be unaffected.

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[3] It is argued that this practice has been extensively used by thrift institutions in the United States in the 1980s (see White, 1990). In Germany, banks are generally required to report securities at the lower of cost or market price, although they also have the right under some circumstances to report securities at cost (Deutsche Bundesbank, 1990).

Continental European banks tend also to report pension reserves and reserves for loan losses on their balance sheet. The impact of these reserves is quite different from that of depreciation reserves. Pension reserves represent equity-like funds that can be, and are, invested in interest-earning assets. The impact of pension reserves will be to increase the interest and gross income margins as well as reported ROAs, though other operating ratios are unlikely to be affected.

The impact of reserves for loan losses depends on whether they represent general or specific provisions. General provisions have the same effect as pension reserves since they imply no reduction in interest income. But specific provisions should involve a suspension of interest accrual so that their effect would be more like that of depreciation reserves.

Table 5

The Impact of Asset Valuation Rules

Bank H

Overstatement of Other Assets and Other Liabilities

Assets			Liabilities		
Loans	52.2	11%	Demand deposits	8.7	0%
Securities	13.1	9%	Other deposits	52.2	7%
Interbank	8.7	9%	Borrowed funds	17.4	9%
Fixed assets	4.3	0%	Other liabilities	17.4	0%
Other assets	21.7	0%	Equity	4.3	0%
Total	100.0	7.69%	Total	100.0	5.22%

Operating Ratios	OAR	OIR	OER
Interest margin	2.47	79.2	57.4
Noninterest income	0.65	20.8	15.1
Gross income	3.12	100.0	72.5
Noninterest expenses	2.26	72.4	52.5
Net income	0.86	27.6	20.0

Table 5 shows the case of a bank that overstates both its other assets and other liabilities. The asset and liability structure as well as spreads and costs are the same as for Bank A, except that Bank H is assumed to have an additional 15% of total assets in other liabilities and other assets. Equity falls to 4.3% and all other assets and liabilities are adjusted accordingly. Bank H reports lower operating asset ratios but its operating income and equity ratios are identical to those of Bank A (minor discrepancies are due to rounding). Banks in continental Europe tend to report reserves for depreciation as liabilities on their balance sheet and this may partly explain their generally lower operating asset ratios.

2.7 Loss Provisions

The treatment of provisions affects the balance sheet totals of banks, but the level of provisioning impacts their reported profitability. Failure to suspend the accrual of interest on nonperforming loans will overstate interest revenues and the interest margin of banks, while failure to provide adequately for future loan losses will understate total noninterest expenses. Loan classification and provisioning are based on an assessment of the ability of borrowers to service their loans and are clearly subjective exercises. However, banks that fail to make adequate provisions, even when their customers are in financial distress and loan servicing is doubtful, overstate their profits as well as their equity capital and total assets.

Although the impact of inadequate provisioning on bank operating ratios is not in doubt, its importance in comparing ratios of different banks, especially across countries, is rather unclear. This is because provisioning is a subjective exercise and the need for provisions can be hidden by informal rollovers and by companies borrowing from one bank to repay a maturing loan to another. In general, banks that report very low levels of loss provisions are more likely than not to understate their provisions and overstate their profits.

Another problem with provisions is that banks in some countries include their loss provisions with other operating costs. This creates comparability problems that can be overcome only by considering total noninterest expenses together.

2.8 Hidden Reserves

An issue that is closely related to provisioning policies is the use of hidden reserves[4]. The problem with hidden reserves is not inadequate provisioning as such, but rather the hidden nature of the provisions. The impact of hidden reserves on bank profitability and reported operating ratios depends on whether hidden reserves are used to smooth out annual fluctuations in bank profits or whether they are also used to build a hidden base of bank capital.

If hidden reserves are only used for smoothing purposes, their impact on income and cost ratios will cancel out over longer periods, although they would hide fluctuations in annual profits and might make more difficult the detection of changes in trends. But if they are used for building a hidden source of capital, then estimates of bank profits must be increased by the rise in hidden reserves over a particular period and bank equity capital by the total volume of hidden reserves.

If a bank maintains its hidden reserves at a constant fraction of its reported equity, the return on reported equity and the total return on its true equity will be the same. The

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[4] Banks in some European countries, and especially Germany, the Netherlands, Switzerland and Luxembourg, are allowed by their supervisory authorities to use hidden reserves as general contingencies against fluctuations in loan losses and profits.

true ROE will be higher than the reported ROE only if hidden reserves increase relative to reported equity. On the other hand, the true ROA of banks with hidden reserves will be higher than the reported ROA, because such banks will have a higher level of both true profits and true equity.

Table 6 shows the balance sheet and operating ratios of Bank I, which has exactly the same asset and liability structure as well as spreads and costs as Bank A, except that 20% of its equity is hidden. Hidden reserves represent 25% of its reported equity and are included with other liabilities. The illustration assumes that hidden reserves are created by overstating expenses by 0.20% of assets and thus increasing hidden reserves by 0.20% which is the same as the return on both reported and true equity. It can be seen that although the interest and gross margins are unchanged, the ROA is lower at 0.80% compared to 1% for Bank A. The true ROA would, of course, be 1% if account is taken of the overstatement of expenses. Also, the reported cost income ratio is higher since operating costs are overstated while revenues are unchanged.

Table 6

The Impact of Hidden Reserves

Bank I

Hidden Reserves a Constant Fraction of Reported Equity

Assets			Liabilities		
Loans	60	11%	Demand deposits	10	0%
Securities	15	9%	Other deposits	60	7%
Interbank	10	9%	Borrowed funds	20	9%
Fixed assets	5	0%	Other liabilities	6	0%
Other assets	10	0%	Equity	4	0%
Total	100	8.85%	Total	100	6.0

Operating Ratios	OAR	OIR	OER
Interest margin	2.85	79.2	71.3
Noninterest income	0.75	20.8	18.7
Gross income	3.60	100.0	90.0
Noninterest expenses	2.80	77.8	70.0
Net income	0.80	22.2	20.0

This example shows how hidden reserves affect ROAs but not ROEs if the hidden reserves do not change as a fraction of reported equity. It should, however, be noted that the interest and gross margins would be different if the hidden reserves are created by understating revenues.

2.9 ROE Analysis

It should be abundantly clear by now that bank operating ratios are affected by differences in capital structure, business mix and accounting conventions. The effects of

many of these differences can only be assessed by detailed knowledge of the structure and practices of different financial systems. There are no easy shortcuts. However, there is one approach which highlights the effect of some of these differences. This is known as the ROE analysis and is based on a combination of two simple identities. First, the ROE is equal to the product of the ROA and bank leverage (i.e. the inverse of the equity capitalization ratio); and second, the ROA is equal to the product of the gross income margin (gross income as a proportion of total assets) and the profit ratio (net income as a proportion of gross income).

Table 7 shows the ROE analysis for the stylized banks used in the preceding discussion. It should be remembered that by assumption the banks discussed in the different examples operate with the same spreads between loan and deposit rates for similar lines of business. Their operating costs are also the same, except for banks D and E where the assumed operating costs reflect the high and low margin nature of their business respectively. The reported operating cost ratios are also different for banks H and I but only because of the effect of accounting practices: in one case, they are lower because of the overstatement of assets, while in the other they are higher because expenses are overstated by the annual transfers to hidden reserves.

Table 7

ROE Analysis

	Profit Ratio	Gross Margin	ROA	Lever	ROE
Bank A	27.8	3.60	1.00	20.0	20.0
Bank B (high equity)	31.9	3.82	1.22	13.3	16.3
Bank C (low equity)	22.8	3.37	0.77	40.0	30.8
Bank D (high margin)	18.9	5.30	1.00	20.0	20.0
Bank E (low margin)	50.0	2.00	1.00	20.0	20.0
Bank F (inflation winner)	40.2	4.35	1.75	20.0	35.0
Bank G (inflation loser)	20.0	3.25	0.65	20.0	13.0
Bank H (overstated assets)	27.6	3.12	0.86	23.3	20.0
Bank I (hidden reserves)	22.2	3.60	0.80	25.0	20.0

Table 7 shows clearly that banks with a high equity capital (and low leverage) have higher profit ratios, gross margins and ROAs. However, their ROEs are lower, although this may partly reflect their lower riskiness. The table also shows that high and low margin banks may have very different operating ratios and still be equally profitable and efficient. The table further highlights the potential distorting impact on bank ratios of inflation as well as of asset valuation and other accounting practices.

2.10 Spreads, Leverage and Inflation

A question that is of particular concern in countries with high inflation regards the impact of inflation on average spreads. The question is whether ROAs in the region of 3% to 5% (or higher) and gross margins of 7% to 10% (or higher) can be explained by the level of inflation. The ROE analysis can be used to shed light on this issue.

For any bank, the first identity used in ROE analysis states that the real ROE "r" is equal to its leverage "g" times its real ROA "a", or in algebraic terms,

$$r = g * a$$

Similarly, the nominal rate of return on equity "n" is equal to its leverage times the nominal return on assets "b"

$$n = g * b$$

With inflation "p", the nominal return on equity is also equal to

$$n = \{(1+r) * (1+p)\} - 1$$

so that the nominal return on assets "b" may also be given by

$$b = \frac{\{(1+r) * (1+p)\} - 1}{g}$$

When inflation is zero, "b" equals "a". The last equation shows that the required nominal ROA, representing the average spread or margin on all assets after the deduction of all costs, depends on the targeted real ROE, the level of inflation and the degree of leverage. A targeted real ROE of 10% would require a nominal ROA of 0.50% with zero inflation and leverage of 20, but the required nominal ROA would rise to 0.78% with 5% inflation, to 1.05% with 10% inflation and 2.15% with inflation of 30%. With a leverage of 10 instead of 20, the corresponding required nominal ROAs would be twice as high and with a leverage of only 5, they would be four times as high.

The second identity used in ROE analysis stipulates that the nominal ROA "b" is equal to the product of the nominal gross income margin "m" and the profit ratio "q".

$$b = m * q$$

or

$$m = b/q$$

and

$$m = \frac{\{(1+r) * (1+p)\} - 1}{g * q}$$

The profit ratio is equal to (1-c), where "c" is the cost/income ratio based on total costs including all types of provisions. Thus, a high cost bank will have a low profit ratio and vice versa. A bank with a profit ratio of 20% would need a gross income margin that is 5 times its nominal ROA, but a bank with a 50% profit ratio would require a gross margin of only twice its ROA. The profit ratio reflects the product mix and range and quality of services offered by a bank but it also depends on its operating efficiency. Table 8 shows that a combination of high inflation, low leverage and high/cost operations may require a very high gross income margin in order to achieve a targeted real ROE of 10%.

Before concluding the general discussion of the determinants of bank operating ratios it is worth stressing two points. First, the equity capitalization ratio used in this analysis differs from the risk-based capital ratio used under the Basle agreement. In the latter, the denominator is not total assets but risk-weighted assets, although off-balance sheet items are also included, while the numerator may also cover non-equity-type capital, such as subordinated debt.

Second, the ROE analysis shows the strong interrelationship between different operating ratios. For instance, a bank with an equity capitalization ratio of 6% and a target ROE of 20% would need to earn a ROA of 1.2%. If such a bank also has a target profit ratio of 40% (i.e. a cost/income ratio of 60%), then it can achieve its targets with a gross income margin of 3%. However, a bank may achieve the same ROE and ROA with a higher gross margin and a lower profit ratio. Thus, a bank with a gross margin of 5% would need a profit ratio of only 24%. Such a bank could operate equally profitably with a cost/income ratio of 76%.

TABLE 8

SPREADS, LEVERAGE AND INFLATION

REQUIRED NOMINAL ROA FOR TARGETED REAL ROE OF 5%

	LEVERAGE					
INFLATION	5	10	15	20	25	40
0%	1.00	0.50	0.33	0.25	0.20	0.13
5%	2.05	1.03	0.68	0.51	0.41	0.26
10%	3.10	1.55	1.03	0.78	0.62	0.39
15%	4.15	2.08	1.38	1.04	0.83	0.52
20%	5.20	2.60	1.73	1.30	1.04	0.65
30%	7.30	3.65	2.43	1.83	1.46	0.91
50%	11.50	5.75	3.83	2.88	2.30	1.44
100%	22.00	11.00	7.33	5.50	4.40	2.75

REQUIRED GROSS INCOME MARGIN
TARGETED REAL ROE OF 10% AND PROFIT RATIO OF 20%

	LEVERAGE					
INFLATION	5	10	15	20	25	40
0%	10.00	5.00	3.33	2.50	2.00	1.25
5%	15.50	7.75	5.17	3.88	3.10	1.94
10%	21.00	10.50	7.00	5.25	4.20	2.63
15%	26.50	13.25	8.83	6.63	5.30	3.31
20%	32.00	16.00	10.67	8.00	6.40	4.00
30%	43.00	21.50	14.33	10.75	8.60	5.38
50%	65.00	32.50	21.67	16.25	13.00	8.13
100%	120.00	60.00	40.00	30.00	24.00	15.00

REQUIRED NOMINAL ROA FOR TARGETED REAL ROE OF 10%

	LEVERAGE					
INFLATION	5	10	15	20	25	40
0%	2.00	1.00	0.67	0.50	0.40	0.25
5%	3.10	1.55	1.03	0.78	0.62	0.39
10%	4.20	2.10	1.40	1.05	0.84	0.53
15%	5.30	2.65	1.77	1.33	1.06	0.66
20%	6.40	3.20	2.13	1.60	1.28	0.80
30%	8.60	4.30	2.87	2.15	1.72	1.08
50%	13.00	6.50	4.33	3.25	2.60	1.63
100%	24.00	12.00	8.00	6.00	4.80	3.00

REQUIRED GROSS INCOME MARGIN
TARGETED REAL ROE OF 10% AND PROFIT RATIO OF 30%

	LEVERAGE					
INFLATION	5	10	15	20	25	40
0%	6.67	3.33	2.22	1.67	1.33	0.83
5%	10.33	5.17	3.44	2.58	2.07	1.29
10%	14.00	7.00	4.67	3.50	2.80	1.75
15%	17.67	8.83	5.89	4.42	3.53	2.21
20%	21.33	10.67	7.11	5.33	4.27	2.67
30%	28.67	14.33	9.56	7.17	5.73	3.58
50%	43.33	21.67	14.44	10.83	8.67	5.42
100%	80.00	40.00	26.67	20.00	16.00	10.00

REQUIRED NOMINAL ROA FOR TARGETED REAL ROE OF 15%

	LEVERAGE					
INFLATION	5	10	15	20	25	40
0%	3.00	1.50	1.00	0.75	0.60	0.38
5%	4.15	2.08	1.38	1.04	0.83	0.52
10%	5.30	2.65	1.77	1.33	1.06	0.66
15%	6.45	3.23	2.15	1.61	1.29	0.81
20%	7.60	3.80	2.53	1.90	1.52	0.95
30%	9.90	4.95	3.30	2.48	1.98	1.24
50%	14.50	7.25	4.83	3.63	2.90	1.81
100%	26.00	13.00	8.67	6.50	5.20	3.25

REQUIRED GROSS INCOME MATGIN
TARGETED REAL ROE OF 10% AND PROFIT RATIO OF 50%

	LEVERAGE					
INFLATION	5	10	15	20	25	40
0%	4.00	2.00	1.33	1.00	0.80	0.50
5%	6.20	3.10	2.07	1.55	1.24	0.78
10%	8.40	4.20	2.80	2.10	1.68	1.05
15%	10.60	5.30	3.53	2.65	2.12	1.33
20%	12.80	6.40	4.27	3.20	2.56	1.60
30%	17.20	8.60	5.73	4.30	3.44	2.15
50%	26.00	13.00	8.67	6.50	5.20	3.25
100%	48.00	24.00	16.00	12.00	9.60	6.00

III. THE EXPERIENCE OF BANKS IN SELECTED OECD COUNTRIES

The operating performance of banks in some OECD countries is summarized in Tables 9 to 14. Tables 9, 11 and 13 cover all commercial banks in 16 countries over the period 1980-86, while Tables 10, 12 and 14 cover various types of banks in 6 countries over the period 1985-89. Tables 9 and 10 show operating asset ratios, Tables 11 and 12 operating income ratios and Tables 13 and 14 operating equity ratios.

3.1 Operating Asset Ratios

Operating asset ratios relate bank revenues and expenses to average total assets. The main usefulness of operating asset ratios is that they are directly comparable to the rates of interest applied on loans and deposits. But operating asset ratios suffer from many weaknesses. Their usefulness is seriously undermined by differences in capital structure, business mix, and accounting practices across countries, among individual banks and over time. Moreover, operating asset ratios tend to place an undue emphasis on banks as financial intermediaries and holders of assets rather than as providers of financial services.

Over the 1980-86 period the highest gross income margin was registered by commercial banks in the UK with 4.93%, followed by Spanish, Norwegian, Italian and American banks, all of which had gross margins in excess of 4% (Table 9). Finnish banks also were very close to this group with a gross margin of 3.92%.

At the other end of the scale, the lowest gross margins were shown by banks in Japan and Luxembourg (less than 2%) and Switzerland and Belgium (less than 3%). Banks in Portugal, Canada, Germany, Sweden, France and the Netherlands had gross margins between 3% and 3.5%.

The banks with the highest gross margins generally also had the highest interest margins and total operating costs. Similarly, the banks with the lowest gross margins reported the lowest interest margins and total operating costs. The close correlation between gross margins and total operating costs suggests that some banks specialize in high margin/high cost business while others focus on low margin/low cost business.

Banks in Japan and Luxembourg were involved to a greater extent than other commercial banks in interbank and other wholesale banking, where both interest spreads and operating costs were low and where the opportunities for generating noninterest fees were limited. The last point is highlighted by the low level of noninterest income for banks from these countries. In contrast, although Swiss banks also engaged in low margin business, they were able to generate significant fee income and thus their gross margin was much higher than that of banks in either Japan or Luxembourg. The fee income of Swiss banks mainly derives from their substantial fiduciary business.

Apart from Swiss banks, banks in Finland also posted a high level of noninterest income. Two possible explanations could be advanced for this. Finnish banks may have resorted to charging their customers fees for various services in order to compensate for

TABLE 9
OPERATING ASSET RATIOS
percent of average total assets

COMMERCIAL BANKS, AVERAGE 1980-86

	Interest Margin	Non-Interest Income	Gross Income	Operat. Costs	Provis.	Total Costs	Pre-tax Net Income	Taxes	After-tax Net Income
Belgium	1.71	0.47	2.18	1.80	0.01	1.81	0.37	0.15	0.22
Canada (1982-86)	2.57	0.76	3.33	2.05	0.57	2.62	0.71	0.18	0.53
Finland	1.84	2.08	3.92	3.04	0.36	3.40	0.52	0.15	0.37
France	2.69	0.48	3.17	2.15	0.63	2.78	0.39	0.17	0.22
Germany	2.37	0.93	3.30	2.14	0.54	2.68	0.62	0.34	0.28
Italy (1980-85)	3.21	1.21	4.42	2.90	0.76	3.66	0.76	0.42	0.34
Japan	1.42	0.28	1.70	1.19	0.03	1.22	0.48	0.25	0.23
Luxembourg	1.07	0.25	1.32	0.40	0.61	1.01	0.31	0.16	0.15
Netherlands	2.28	0.74	3.02	1.95	0.58	2.53	0.49		
Norway	3.25	1.43	4.68	3.26	0.72	3.98	0.70	0.13	0.57
Portugal	2.37	1.05	3.42	2.11	0.83	2.94	0.48	0.06	0.42
Spain	3.90	0.83	4.73	3.14	0.89	4.03	0.70	0.19	0.51
Sweden (1981-86)	2.20	1.02	3.22	1.97	0.78	2.75	0.47	0.24	0.23
Switzerland	1.34	1.18	2.52	1.40	0.43	1.83	0.69	0.20	0.49
United Kingdom	3.33	1.60	4.93	3.40	0.52	3.92	1.01	0.36	0.65
United States	3.22	1.11	4.33	2.95	0.49	3.44	0.89	0.21	0.68

TABLE 10
OPERATING ASSET RATIOS
percent of average total assets

AVERAGE 1985-89

	Interest Margin	Non-Interest Income	Gross Income	Operat. Costs	Provis.	Total Costs	Pre-tax Net Income	Taxes	After-tax Net Income
UNITED STATES									
All Commercial Banks	3.39	1.52	4.91	3.28	0.84	4.12	0.79	0.23	0.56
Small banks	4.05	0.84	4.89	3.35	0.65	4.00	0.89	0.18	0.71
Medium banks	3.73	1.33	5.06	3.46	0.67	4.13	0.93	0.20	0.73
Money centre banks	2.46	2.12	4.58	3.11	1.12	4.23	0.35	0.19	0.16
Other large banks	3.27	1.57	4.84	3.20	0.93	4.13	0.71	0.15	0.56
GERMANY									
All commercial banks	2.21	0.73	2.94	2.11	0.13	2.24	0.70	0.38	0.32
Big commercial banks	2.60	0.98	3.58	2.58	0.11	2.69	0.89	0.49	0.40
Savings banks	3.05	0.33	3.38	2.15	0.43	2.58	0.80	0.53	0.27
Credit cooperatives	3.07	0.39	3.46	2.73	0.07	2.80	0.66	0.45	0.21
Giro landesbanks	0.78	0.10	0.88	0.48	0.17	0.65	0.23	0.15	0.08
UNITED KINGDOM									
Large commercial banks	3.21	1.71	4.92	3.27	0.81	4.08	0.84	0.34	0.50
Building societies	2.04	0.36	2.40	1.15	0.00	1.15	1.25	0.45	0.80
SPAIN (1986-89)									
Commercial banks	4.02	0.99	5.01	3.19	0.63	3.82	1.19		
Savings banks	5.00	0.69	5.69	4.28	0.36	4.64	1.05		
CANADA (1984-88)									
Domestic banks	2.78	0.97	3.75	2.20	0.65	2.85	0.91	0.30	0.60
Foreign banks	1.73	0.72	2.45	1.52	0.34	1.86	0.59	0.30	0.29
NETHERLANDS									
Commercial banks	2.02	0.74	2.76	1.82	0.23	2.05	0.71		
Savings banks	3.12	0.29	3.41	2.36	0.04	2.40	1.01		

their low interest margin. But they may also have provided a greater amount of fee-based services than banks in other countries. Until the recent financial liberalization, banks in Scandinavian countries were encouraged to provide guarantees to large local corporations to support their borrowings from the eurocurrency markets. They were also encouraged to offer various services in the housing finance field but without undertaking the long-term funding of residential mortgages. Both activities generated fees without increasing the balance sheet totals of banks. It is notable that banks in Norway and Sweden also had relatively high levels of fee income.

Banks in several countries (Italy, Norway, Portugal, Spain and Sweden) had unusually high levels of provisions. However, this item probably covered not only provisions against doubtful debts, but also provisions for depreciation, pensions and losses on holdings of securities. In other countries, provisions for depreciation and pensions would be classified under operating costs. In contrast, banks in Belgium and Japan showed very low levels of provisions, which suggests that provisions in these countries were reported under operating costs. These differences in the accounting treatment of provisions imply that attention should perhaps be focussed only on total operating costs.

Table 10 presents the operating asset ratios of four types of commercial banks in the United States, several types of banks in Germany, and two types of banks in the United Kingdom, Spain, Canada and the Netherlands over the period 1985-89[5]. The data show that German giro landesbanks, the UK building societies, the Canadian foreign commercial banks, the Dutch commercial banks and the German commercial banks had, in that order, the lowest gross margins. They also had the lowest interest margins and lowest operating cost/asset ratios, although the order was slightly different for these ratios.

Thus, the correlation between the level of margins and the level of costs that was found in Table 9 for commercial banks in 16 OECD countries is confirmed for a more detailed classification of banks in a smaller number of countries. This finding is further underscored by the very low gross margins and other operating asset ratios of the giro landesbanks in Germany. These banks operate as the central clearing institutions for the German savings banks and specialize almost exclusively in interbank and wholesale business.

American commercial banks operated with gross margins that were 200 basis points greater than those of German commercial banks over the 1985-89 period. Moreover,the operating ratios of US commercial banks increased during the 1980s, whereas those of German banks declined.

Among different types of American banks, the lowest gross margin was registered by the money center banks, which also had the lowest interest margin and lowest operating costs. But money center banks reported very high levels of fee income, which is consistent with their specialization in such services as trade and foreign exchange finance and their growing involvement in investment banking outside the United States.

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[5] The data for Spanish banks cover the period 1986-89 and those for Canadian banks the period 1984-88.

Worth noting also are the very high gross margins of the large UK commercial banks and the Spanish commercial and savings banks. These banks also continued to show high operating costs.

American banks increased substantially their provisions in the second half of the 1980s, from 0.49% to 0.84%. For the money center banks, provisions reached a staggering 1.12% of average total assets. In contrast, German commercial banks reduced their provisions from 0.54% to only 0.13%. To a large extent, this reflected the earlier provisioning against loans to developing countries by the more cautious German banks. But the loss provisions of American banks were inflated in recent years by their massive losses and nonperforming loans in real estate loans and highly leveraged transactions. The large UK commercial banks also experienced a big rise in their loss provisions.

Except for Canadian banks, the banks with the highest ROAs also had the highest gross margins in the early 1980s. At the other end of the scale, the banks with the lowest margins also reported the lowest ROAs, except for Swiss banks which showed a relatively high ROA, mainly because of their success in generating a high level of fee income.

In the more recent period, most types of German banks as well as the UK building societies reported higher ROAs than the American commercial banks and the large UK commercial banks, even though their gross margins were generally much lower. The ROA of US money center banks was particularly low. The breakdown of the correlation between high margins and high ROAs should be attributed to the unusually high levels of loss provisions experienced by commercial banks in the United States and the United Kingdom and the very special nature of the business of UK building societies. The pattern still held true for the Spanish commercial and savings banks and the German giro landesbanks.

3.2 Operating Income Ratios

Operating income ratios relate revenues and costs to the gross income of banks. Like operating asset ratios, these ratios are also affected by differences in capital structure and accounting practices, but they are influenced less by differences in business mix. Three ratios are of particular importance: the share of fee income in total gross income, the cost/income ratio and the profit ratio, i.e the ratio of net income to gross income.

The structure of gross income is interesting because of the growing importance that commercial banks attach to the development of fee-based services. The share of noninterest income provides an indication of the extent to which banks are successful in generating income from fee-based services to offset the fall in income from the narrowing of interest rate spreads.

The securitization of corporate lending and household finance has resulted in the removal of a growing volume of bank loans from bank balance sheets. It has also stimulated the growth of noninterest income as banks have sought to provide various

services linked to the issue of commercial paper and other securities by the corporate sector and to the origination of mortgage loans and consumer credit.

Fee income is also generated in other more traditional bank services linked with foreign trade, bank guarantees, securities transactions and mergers and acquisitions.

Finnish and Swiss banks had the highest noninterest income ratios of 53% and 47% respectively during the period 1980-86 (Table 11). UK, Swedish and Norwegian banks posted ratios in excess of 30%. Rather surprisingly, American and Canadian banks reported lower relative levels of fee income than German and Italian banks. It is not clear why Canadian banks did not develop further their fee-based services, but in the case of the American banks, the low ratio is due to the part played by the large number of small local banks.

In the more recent period between 1985 and 1989, American commercial banks raised the contribution of noninterest income to 31% of gross income (Table 12). Among different types of banks, the money center banks reported fee income equal to 46% of gross income. They were followed by the group of other large banks, which mainly includes the so-called super-regionals, with 32%, the medium-size banks with 26% and the small local banks with 17%.

In contrast to American banks, the German commercial banks did not show an increase in their reliance on fee-based services. Moreover, noncommercial German banks showed a very low contribution from fee-based services. The large UK commercial banks, the Canadian banks and the Dutch commercial banks showed above average levels of noninterest income.

Because of the general correlation between margins and costs, the cost/income ratio does not show much variation across banks, despite some substantial differences in product mix. With the exception of banks in Switzerland and Luxembourg on the one hand, and Belgium and Finland on the other, banks in most countries reported operating cost/income ratios in the region between 60% and 70% in the early 1980s. Banks with ratios closer to the lower end of this range tended to include some provisions, such as those for depreciation and pensions, with loss provisions rather than with operating costs.

The total costs to income ratio, which covers both operating expenses and all types of provisions, shows a much narrower variation. Banks in 10 countries reported total cost/income ratios in the region between 79% and 85%. Banks in Finland, France and Portugal had ratios slightly in excess of 85%, while banks in Japan, Switzerland and Luxembourg had ratios below 79%.

The pattern in the more recent period for banks in six countries was somewhat different, especially for the total cost to income ratio. Because of the generally lower levels of provisions, German commercial banks reported total cost/income ratios of around 76%. The savings banks also exhibited a similar ratio, although in their case, provisions were higher but operating costs much lower, a pattern that was even more pronounced for the giro landesbanks.

The large structural differences in the cost/income ratios of German savings banks and credit cooperatives is worth noting. Savings banks enjoyed substantially lower operating costs, although these were largely, but not completely, offset by significantly higher levels of provisions. Three possible explanations can be advanced for this. The first is the possibility of substantial differences in accounting practices even among different types of banks in the same country. The second explanation is that, even though both types of banks specialize in retail banking and serve the banking needs of smaller firms, credit cooperatives are operationally less efficient than savings banks. The third explanation is that credit cooperatives are better at monitoring the performance of their customers and thus at avoiding loan losses than the savings banks, but their greater monitoring effort is reflected in higher operating costs. Without more detailed knowledge of the operations and accounting practices of these banks, it is not possible to say which explanation is more likely to be valid.

Spanish commercial banks were able to report low total cost/income ratios at 76%, but commercial banks in the United States and the United Kingdom as well as the Spanish savings banks had ratios between 80% and 85%, except for the US money center banks which posted a very high ratio of 92%. The ratio of provisions to gross income at 24% was 8 times as large as the corresponding ratio of the big German banks.

Finally, the low cost/income ratio of Canadian commercial banks and, especially the UK building societies, are worth stressing. At 48%, the cost/income ratio of building societies is at a level that most commercial bankers can only dream about. Building societies combine low margins with low costs that leave them with a very high profit ratio of 52% of gross income, almost twice the level of any other group of banks shown in these tables. The explanation for this remarkable performance lies in their specialization in a market with a well established demand for a proven product and the efficient offer of a simple range of services.

The profit ratio is equal to one minus the total cost/income ratio. It ranges between 15% and 25% of gross income for most types of banks. Major exceptions are, on the one hand, the UK building societies, which as already noted achieved a remarkable 52% profit ratio, and, on the other, the US money center banks, which find themselves at the other end of the spectrum with a profit ratio of only 8%.

TABLE 11
OPERATING INCOME RATIOS
percent of gross income

COMMERCIAL BANKS, AVERAGE 1980-86

	Interest Margin	Non-Interest Income	Gross Income	Operat. Costs	Provis.	Total Costs	Pre-tax Net Income	Taxes	After-tax Net Income
Belgium	78.4	21.6	100.0	82.6	0.5	83.0	17.0	6.9	10.1
Canada (1982-86)	77.2	22.8	100.0	61.6	17.1	78.7	21.3	5.4	15.9
Finland	46.9	53.1	100.0	77.6	9.2	86.7	13.3	3.8	9.4
France	84.9	15.1	100.0	67.8	19.9	87.7	12.3	5.4	6.9
Germany	71.8	28.2	100.0	64.8	16.4	81.2	18.8	10.3	8.5
Italy (1980-85)	72.6	27.4	100.0	65.6	17.2	82.8	17.2	9.5	7.7
Japan	83.5	16.5	100.0	70.0	1.8	71.8	28.2	14.7	13.5
Luxembourg	81.1	18.9	100.0	30.3	46.2	76.5	23.5	12.1	11.4
Netherlands	75.5	24.5	100.0	64.6	19.2	83.8	16.2	0.0	0.0
Norway	69.4	30.6	100.0	69.7	15.4	85.0	15.0	2.8	12.2
Portugal	69.3	30.7	100.0	61.7	24.3	86.0	14.0	1.8	12.3
Spain	82.5	17.5	100.0	66.4	18.8	85.2	14.8	4.0	10.8
Sweden (1981-86)	68.3	31.7	100.0	61.2	24.2	85.4	14.6	7.5	7.1
Switzerland	53.2	46.8	100.0	55.6	17.1	72.6	27.4	7.9	19.4
United Kingdom	67.5	32.5	100.0	69.0	10.5	79.5	20.5	7.3	13.2
United States	74.4	25.6	100.0	68.1	11.3	79.4	20.6	4.8	15.7

TABLE 12
OPERATING INCOME RATIOS
percent of gross income

AVERAGE 1985-89

	Interest Margin	Non-Interest Income	Gross Income	Operat. Costs	Provis.	Total Costs	Pre-tax Net Income	Taxes	After-tax Net Income
UNITED STATES									
All Commercial Banks	69.0	31.0	100.0	66.8	17.1	83.9	16.1	4.7	11.4
Small banks	82.8	17.2	100.0	68.5	13.3	81.8	18.2	3.7	14.5
Medium banks	73.7	26.3	100.0	68.4	13.2	81.6	18.4	4.0	14.4
Money centre banks	53.7	46.3	100.0	67.9	24.5	92.4	7.6	4.1	3.5
Other large banks	67.6	32.4	100.0	66.1	19.2	85.3	14.7	3.1	11.6
GERMANY									
All commercial banks	75.2	24.8	100.0	71.8	4.4	76.2	23.8	12.9	10.9
Big commercial banks	72.6	27.4	100.0	72.1	3.1	75.1	24.9	13.7	11.2
Savings banks	90.2	9.8	100.0	63.6	12.7	76.3	23.7	15.7	8.0
Credit cooperatives	88.7	11.3	100.0	78.9	2.0	80.9	19.1	13.0	6.1
Giro landesbanks	88.6	11.4	100.0	54.5	19.3	73.9	26.1	17.0	9.1
UNITED KINGDOM									
Large commercial banks	65.2	34.8	100.0	66.5	16.5	82.9	17.1	6.9	10.2
Building societies	85.0	15.0	100.0	47.9	0.0	47.9	52.1	18.8	33.3
SPAIN (1986-89)									
Commercial banks	80.2	19.8	100.0	63.7	12.6	76.2	23.8		
Savings banks	87.9	12.1	100.0	75.2	6.3	81.5	18.5		
CANADA (1984-88)									
Domestic banks	74.1	25.9	100.0	58.7	17.3	76.0	24.3	8.0	16.0
Foreign banks	70.6	29.4	100.0	62.0	13.9	75.9	24.1	12.2	11.8
NETHERLANDS									
Commercial banks	73.2	26.8	100.0	65.9	8.3	74.3	25.7		
Savings banks	91.5	8.5	100.0	69.2	1.2	70.4	29.6		

3.3 Operating Equity Ratios

Operating equity ratios relate revenues, costs and profits to average equity. They are not affected by differences in capital structure and business mix but, like the other ratios, they can be heavily distorted by differences in accounting practices.

Traditionally, analytical attention has focussed on the ROE, which is the ratio of net income (before or after taxes) to average equity. The ROE is about the bottom line and is the one measure that should matter most in analyzing bank performance. Some analysts pay more attention to the ROA but, as already argued above, this is distorted by the level of equity capitalization ratio. On the other hand, although the ROE would be higher for a more highly leveraged bank, this could merely reflect the higher risks faced by such banks and should not be taken as an indication of higher efficiency.

Two measures that provide an indication of the higher risks faced by more highly leveraged banks are the gross income to equity ratio and the total costs to equity ratios. These two ratios would indicate the extent of overtrading or undertrading of banks and would thus merit greater attention when analyzing the performance of different banks.

The equity capitalization ratios of banks varied over the 1980-86 period from a high 7.9% for Spanish banks and 7.1% for Finnish banks to a low 1.4% for Swedish banks and 2.4% for French and Japanese banks (Table 13). In the more recent period, the small American commercial banks and the Dutch savings banks had the highest equity capitalization ratio at over 8% (Table 14).

The gross income and total costs to equity ratios strongly suggest that Swedish banks were heavily overtrading in the early 1980s with ratios in excess of 200%. In fact, because of their very low level of equity, Swedish commercial banks reported a ROE of 34%, even though their ROA was only 0.47%. Other banks with high income and cost to equity ratios included the French, Italian, UK and Norwegian banks. The first two had rather low equity levels but the last two were rather highly capitalized.

At the other end of the scale, banks in Luxembourg and Switzerland, and to a lesser extent, Spain and Portugal had low income and cost to equity ratios, suggesting that these banks were probably undertrading. But banks in these countries generally reported low ROEs, a finding that is rather surprising in the case of Swiss banks. The highest ROE was displayed by Swedish banks, followed by UK and Japanese banks.

The operating equity ratios for the more recent period 1985-89 underscore the disastrous performance of American money center banks (Table 14). These banks had relatively high levels of trading with a gross income to equity ratio of 100%, but their cost performance, and especially their loss provisions, caused their pre-tax ROE to be as low as 8% and their after tax ROE to be a paltry 3.5%. After allowing for inflation, but without taking into account revaluation gains on fixed assets and trade investments, the real ROE was a paltry 0.3% (see below, Table 15). The small local American banks displayed low levels of trading with ratios of 60% and 49% but their ROE, though higher than the money center banks, was low by comparison to European commercial banks.

TABLE 13
OPERATING EQUITY RATIOS
percent of average equity

COMMERCIAL BANKS, AVERAGE 1980-86

	Interest Margin	Non-Interest Income	Gross Income	Operat. Costs	Provis.	Total Costs	Pre-tax Net Income	Taxes	After-tax Net Income	Memo Equity Ratio
Belgium	69.5	19.1	88.6	73.2	0.4	73.6	15.0	6.1	8.9	2.46
Canada (1982-86)	60.0	17.8	77.8	47.9	13.3	61.2	16.6	4.2	12.4	4.28
Finland	26.0	29.4	55.4	43.0	5.1	48.1	7.4	2.1	5.2	7.07
France	114.5	20.4	134.9	91.5	26.8	118.3	16.6	7.2	9.4	2.35
Germany	57.7	22.6	80.3	52.1	13.1	65.2	15.1	8.3	6.8	4.11
Italy (1980-85)	83.8	31.6	115.4	75.7	19.8	95.6	19.8	11.0	8.9	3.83
Japan	60.2	11.9	72.0	50.4	1.3	51.7	20.3	10.6	9.7	2.36
Luxembourg	33.3	7.8	41.1	12.5	19.0	31.5	9.7	5.0	4.7	3.21
Netherlands	66.1	21.4	87.5	56.5	16.8	73.3	14.2	na	na	3.45
Norway	70.0	30.8	100.9	70.3	15.5	85.8	15.1	2.8	12.3	4.64
Portugal	39.4	17.5	56.9	35.1	13.8	48.9	8.0	1.0	7.0	6.01
Spain	49.4	10.5	59.9	39.8	11.3	51.1	8.9	2.4	6.5	7.89
Sweden (1981-86)	160.6	74.5	235.0	143.8	56.9	200.7	34.3	17.5	16.8	1.37
Switzerland	22.7	20.0	42.6	23.7	7.3	31.0	11.7	3.4	8.3	5.91
United Kingdom	69.7	33.5	103.1	71.1	10.9	82.0	21.1	7.5	13.6	4.78
United States	53.7	18.5	72.2	49.2	8.2	57.3	14.8	3.5	11.3	6.00

TABLE 14
OPERATING EQUITY RATIOS
percent of average equity

AVERAGE 1985-89

	Interest Margin	Non-Interest Income	Gross Income	Operat. Costs	Provis.	Total Costs	Pre-tax Net Income	Taxes	After-tax Net Income	Memo Equity Ratio
UNITED STATES										
All Commercial Banks	55.0	24.7	79.7	53.2	13.6	66.9	12.8	3.7	9.1	6.16
Small banks	49.6	10.3	59.9	41.1	8.0	49.0	10.9	2.2	8.7	8.16
Medium banks	56.9	20.3	77.3	52.8	10.2	63.1	14.2	3.1	11.1	6.55
Money centre banks	53.7	46.3	100.0	67.9	24.5	92.4	7.6	4.1	3.5	4.58
Other large banks	60.4	29.0	89.5	59.1	17.2	76.3	13.1	2.8	10.4	5.41
GERMANY										
All commercial banks	47.5	15.7	63.2	45.4	2.8	48.2	15.1	8.2	6.9	4.65
Big commercial banks	55.6	20.9	76.5	55.1	2.4	57.5	19.0	10.5	8.5	4.68
Savings banks	81.3	8.8	90.1	57.3	11.5	68.8	21.3	14.1	7.2	3.75
Credit cooperatives	79.7	10.1	89.9	70.9	1.8	72.7	17.1	11.7	5.5	3.85
Giro landesbanks	33.9	4.3	38.3	20.9	7.4	28.3	10.0	6.5	3.5	2.30
UNITED KINGDOM										
Large commercial banks	63.8	34.0	97.8	65.0	16.1	81.1	16.7	6.8	9.9	5.03
Building societies	47.6	8.4	55.9	26.8	0.0	26.8	29.1	10.5	18.6	4.29
SPAIN (1986-89)										
Commercial banks	61.4	15.1	76.5	48.7	9.6	58.3	18.2			6.55
Savings banks	83.3	11.5	94.8	71.3	6.0	77.3	17.5			6.00
CANADA (1984-88)										
Domestic banks	57.6	20.1	77.6	45.5	13.5	59.0	18.8	6.2	12.4	4.83
Foreign banks	23.1	9.6	32.8	20.3	4.5	24.9	7.9	4.0	3.9	7.48
NETHERLANDS										
Commercial banks	50.5	18.5	69.0	45.5	5.8	51.3	17.8			4.00
Savings banks	37.9	3.5	41.4	28.6	0.5	29.1	12.3			8.24

Among German banks, the giro landesbanks had low trading ratios as might be expected, though rather surprisingly they also showed a low ROE. The income and cost to equity ratios of the other banks were generally in the middle range and their ROEs were respectable but not too high.

The performance of UK building societies is again worth noting. These institutions generally had low levels of income and cost to equity ratios, suggesting a low level of trading, but because of a better containment of costs (their cost to equity ratio was by far the lowest among all types of institutions reviewed in this paper), their ROE was a quite high 29%.

The data on Tables 13 and 14 show the nominal ROEs for different banks without taking account of differences in inflation rates. A full inflation adjustment of nominal returns would require an estimate of the revaluation gains on fixed assets, which are likely to be large for banks with extensive branch networks, as well as on marketable securities for those banks that report their securities at the lower of cost or market value. Such data are not readily available.

Table 15 reports data on real ROEs on a pre-tax and after-tax basis by adjusting nominal returns by the average GDP deflator for each country. Although this is an incomplete adjustment, it provides an indication of the monetary correction that is necessary in different countries. Thus, Spanish banks which report high nominal rates of return, are shown after the adjustment to have moderate levels of real profitability. In contrast, the UK building societies, German savings banks, and German, Dutch and Canadian commercial banks report high real rates of return. Worth noting are the very low real after-tax rates of return of American money center banks and foreign banks in Canada.

Table 15

Impact of Inflation

Commercial and Other Banks, 1985-89

	Pre Tax Nominal ROE	After Tax Nominal ROE	Inflation Rate	Pre Tax Real ROE	After Tax Real ROE
United States					
All commercial banks	12.8	9.1	3.2	9.6	5.9
Small banks	10.9	8.7	3.2	7.7	5.5
Medium banks	14.2	11.1	3.2	11.0	7.9
Money center banks	7.6	3.5	3.2	4.4	0.3
Other large banks	13.1	10.4	3.2	9.9	7.2
Germany					
All commercial banks	15.1	8.2	2.3	12.8	5.9
Big commercial banks	19.0	10.5	2.3	16.7	8.2
Savings banks	21.3	14.1	2.3	19.0	11.8
Credit cooperatives	17.1	11.7	2.3	14.8	9.4
Giro landesbanks	10.0	6.5	2.3	7.7	4.2
United Kingdom					
Large commercial banks	16.7	9.9	5.4	11.3	4.5
Building societies	29.1	18.6	5.4	23.7	13.2
Spain (1986-89)					
Commercial banks	18.2	..	7.8	10.4	..
Savings banks	17.5	..	7.8	9.7	..
Canada (1984-88)					
Domestic banks	18.8	12.4	3.5	15.3	8.9
Foreign banks	7.9	3.9	3.5	4.4	0.4
Netherlands					
Commercial banks	17.8	..	1.0	16.8	..
Savings banks	12.3	..	1.0	11.3	..

IV. ANALYTICAL AND POLICY ISSUES

There are a number of analytical and policy issues that arise from the preceding discussion of bank operating ratios. Are the observed differences in operating ratios merely the result of differences in capital structure, business mix and accounting conventions or do they reflect, at least in part, differences in efficiency? What is the correlation between different ratios? Is there a combination of ratios that could be most useful in summarizing the performance of banks in different countries?

Moreover, two of the most striking results of the analysis of bank operating ratios are the significant differences in performance between American and German banks on the one hand and between the large UK commercial banks and building societies on the other. In the context of the discussion of the determinants of bank operating ratios, two questions of wider interest arise. First, are American banks really so much less efficient than German banks as their respective operating ratios suggest? And, second, what special factors could explain the substantial differences in performance between UK commercial banks and building societies?

Finally, there is the question of what are the implications of the approach and results of this paper for analyzing the performance of banks in developing countries.

4.1 ROE and Covariance Analysis

In terms of the first set of questions, a ROE analysis provides a combination of ratios that may best summarize the various operating ratios and may be most useful in analyzing differences in performance across groups of banks or across countries. The ROE analysis of Tables 16 and 17 brings together in a simple tabulated form, not only the ROE and ROA but also the leverage, gross margin and profit ratio of different groups of banks. Moreover, although not shown explicitly, the total cost/asset and total cost/income ratios can be easily inferred from the tables. Table 16 shows the ROE analysis for the period 1980-86 and Table 17 for the period 1985-89. The correlation between profitability ratios is shown in Figures 1 and 2.

Table 16 shows clearly that both banks with low gross margins and low ROAs (Japan, Sweden) and banks with high gross margins and high ROAs (United Kingdom) can have high ROEs. The table also suggests that countries with fragmented banking systems, such as the United States, Norway and Italy where there are large numbers of banks with regional specialization, tend to have higher operating ratios than countries with more consolidated banking systems, such as Canada, the Netherlands and Sweden, where there is a smaller number of banks with nationwide operations. However, this pattern does not apply in all cases since the United Kingdom, and to a lesser extent, Spain have consolidated banking systems but their commercial banks exhibit high margins.

Table 17 summarizes the performance of banks in different countries in the more recent period. The contrasting experience of money center banks and small and medium-size banks in the United States is clearly highlighted as is that between commercial banks

Table 16

ROE Analysis

Commercial Banks, 1980-86

	Profit Ratio	Gross Margin	ROA	Lever	ROE
Belgium (BEL)	17.0	2.18	0.37	40.7	15.0
Canada (CAN) (1982-86)	21.3	3.33	0.71	23.4	16.6
Finland (FIN)	13.3	3.92	0.52	14.1	7.4
France (FRA)	12.3	3.17	0.39	42.6	16.6
Germany (DEU)	18.8	3.30	0.62	24.3	15.1
Italy (ITA) (1980-85)	17.2	4.42	0.76	26.1	19.8
Japan (JPN)	28.2	1.70	0.48	42.4	20.3
Luxembourg (LUX)	23.5	1.32	0.31	31.2	9.7
Netherlands (NLD)	16.2	3.02	0.49	29.0	14.2
Norway (NOR)	15.0	4.68	0.70	21.6	15.1
Portugal (PRT)	14.0	3.42	0.48	16.6	8.0
Spain (ESP)	14.8	4.73	0.70	12.7	8.9
Sweden (SWE) (1981-86)	14.6	3.22	0.47	73.0	34.3
Switzerland (CHE)	27.6	2.52	0.69	16.9	11.7
United Kingdom (GBR)	20.5	4.93	1.01	20.9	21.1
United States (USA)	20.6	4.33	0.89	16.7	14.8

Figure 1: Correlation of Profitability Ratios
Commercial Banks, 1980-1986

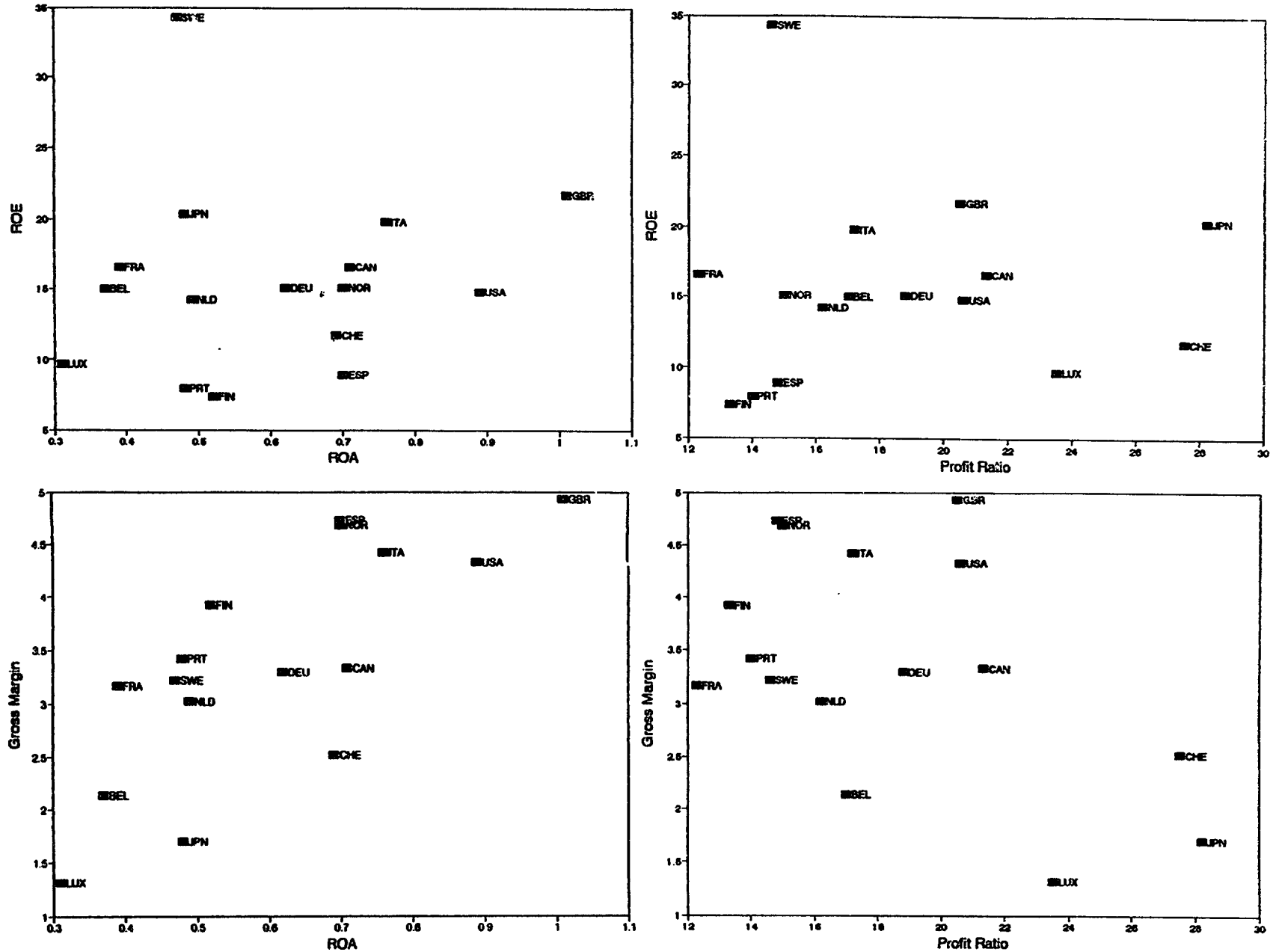


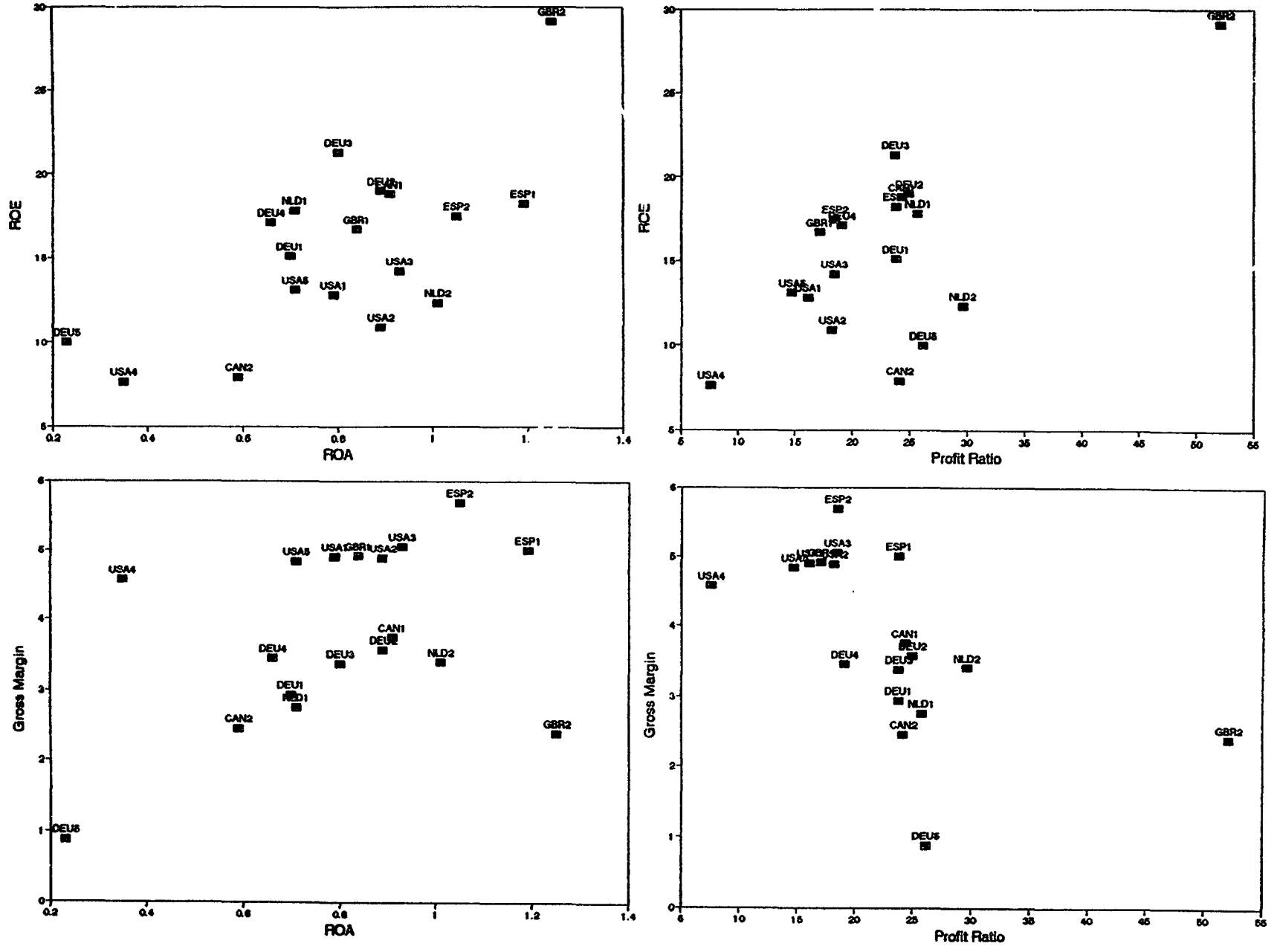
Table 17

ROE Analysis

Commercial and Other Banks, 1985-89

	Profit Ratio	Gross Margin	ROA	Lever	ROE
United States					
All commercial banks (USA1)	16.1	4.91	0.79	16.2	12.8
Small banks (USA2)	18.2	4.89	0.89	12.3	10.9
Medium banks (USA3)	18.4	5.06	0.93	15.3	14.2
Money center banks (USA4)	7.6	4.58	0.35	21.8	7.6
Other large banks (USA5)	14.7	4.84	0.71	18.5	13.1
Germany					
All commercial banks (DEU1)	23.8	2.94	0.70	21.5	15.1
Big commercial banks (DEU2)	24.9	3.58	0.89	21.4	19.0
Savings banks (DEU3)	23.7	3.38	0.80	26.7	21.3
Credit cooperatives (DEU4)	19.1	3.46	0.66	26.0	17.1
Giro landesbanks (DEU5)	26.1	0.88	0.23	43.5	10.0
United Kingdom					
Large commercial banks (GBR1)	17.1	4.92	0.84	19.9	16.7
Building societies (GBR2)	52.1	2.40	1.25	23.3	29.1
Spain (1986-89)					
Commercial banks (ESP1)	23.8	5.01	1.19	15.3	18.2
Savings banks (ESP2)	18.5	5.69	1.05	16.7	17.5
Canada (1984-88)					
Domestic banks (CAN1)	24.3	3.75	0.91	20.7	18.8
Foreign banks (CAN2)	24.1	2.45	0.59	13.4	7.9
Netherlands					
Commercial banks (NLD1)	25.7	2.76	0.71	25.0	17.8
Savings banks (NLD2)	29.6	3.41	1.01	12.1	12.3

Figure 2: Correlation of Profitability Ratios
Commercial and other Banks, 1985-1989



and building societies in the United Kingdom, commercial and savings banks in the Netherlands and Spain, and domestic and foreign commercial banks in Canada.

A simple covariance analysis shows the degree of correlation between various bank operating ratios. Table 18 summarizes the correlation coefficients for the ratios that are included in the ROE analysis, except that the equity capitalization ratio is used instead of its inverse. A clearly different pattern characterizes the data of the two different periods. This may reflect a change over time in the underlying performance of banks but it may also be due to differences in the characteristics of banks included in the two samples.

For the 1980-86 period, the data show that the ROE has a high negative correlation with the equity capitalization ratio but is not closely linked with either the ROA, gross margin or profit ratio. There is a strong positive correlation between the equity capitalization ratio and both the ROA and the gross margin and especially between the gross margin and the ROA. A very high correlation (not shown in the table) also exists between the gross margin and the cost/asset ratio (0.99).

In the 1985-89 period, the matrix of correlation coefficients is substantially different. In the first place, the ROE is now highly and positively correlated with the profit ratio (0.68) and the ROA (0.67). Its negative correlation with the equity capitalization ratio is much reduced, The gross margin is less well correlated with the ROA, while in contrast, the profit ratio and ROA exhibit closer positive covariance. In general, the gross margin and equity capitalization ratio are less well correlated with other variables in the more recent period. Note, however, that the gross margin and total cost/asset ratio continue to have a very high correlation coefficient of 0.98.

Table 18

Covariance Analysis

1980-86

	PR	GM	ROA	ECR	ROE
Profit ratio (PR)	1.00				
Gross margin (GM)	-0.49	1.00			
ROA	0.17	0.76	1.00		
Equity Capital (ECR)	-0.09	0.54	0.48	1.00	
ROE	0.03	0.03	0.11	-0.69	1.00

1985-89

	PR	GM	ROA	ECR	ROE
Profit ratio (PR)	1.00				
Gross margin (GM)	-0.57	1.00			
ROA	0.47	0.41	1.00		
Equity capital (ECR)	-0.14	0.50	0.44	1.00	
ROE	0.68	-0.07	0.67	-0.34	1.00

As already noted, it is not clear whether the significant change in the correlation pattern of different operating ratios reflects a change in performance, resulting from a greater emphasis on profitability and smaller variation in equity capitalization ratios or whether it is simply the result of sample differences. However, the covariance analysis lends support to the argument that high gross margins, cost/asset ratios and ROAs are not necessarily indicative of either high inefficiency or high profitability, but may mainly reflect the business mix and capital structure of different banks.

4.2 Differences between American and German Banks

Table 19 shows the operating ratios of all commercial banks in the United States and Germany for two periods - 1980-86 and 1985-89 and for the money center banks and big German banks for 1985-89.

German banks report much lower gross margins and cost/asset ratios than their American counterparts. The difference in gross margins for all commercial banks is almost 200 basis points in the more recent period, while that between big banks is 100 basis points. Differences in operating costs are less pronounced, while the profitability of American banks is much lower in the more recent period because of their very large loss provisions.

Although German banks may indeed be more efficient than American banks, there are a number of factors that may explain at least some of the difference in performance. The first such factor relates to their different equity capitalization ratios. US commercial banks have higher capitalization than German ones. In the more recent period the difference is just over 1.50% of total assets. To achieve the same ROE, American banks would require a ROA of 0.93 against 0.70 for German banks. However, the capital structure of large banks is, if anything, the reverse, with the big German banks reporting a slightly higher level of equity than American money center banks.

The second factor relates to their business mix. American banks engage to a greater extent in loan securitization and fee-based services than German banks. In addition, American households place a greater proportion of their financial assets in mutual funds and marketable securities as well as in contractual savings than German households. Thus, German banks may be able to generate a greater volume of business from a given cost base (including branch networks and staff) than American banks. Differences in business mix may be particularly important for the comparison of operating ratios of large banks since money center banks in the United States generate almost half of their gross income from fee-based services.

German banks operate a much larger branch network in relation to population than US banks, both on an individual bank basis and for the system as a whole. Branch density is over 750 branches per million people in Germany against 450 branches in the United States. Moreover, like their counterparts in other European countries, they offer a more complete range of payment services, with electronic payments, especially direct debits and direct deposit of payroll and other credit transfers, representing 58% of all payments against only 3% for the United States. German banks also operate as universal banks,

Table 19

Operating Ratios of US and German Banks

	1980-86		1985-89		1985-89	
	US banks	German banks	US banks	German banks	MCB	BGB
Operating asset ratios						
Interest margin	3.22	2.37	3.39	2.21	2.46	2.60
Noninterest income	1.11	0.93	1.52	0.73	2.12	0.98
Gross income	4.33	3.30	4.91	2.94	4.58	3.58
Operating costs	2.95	2.14	3.28	2.11	3.11	2.58
Loss provisions	0.49	0.54	0.84	0.13	1.12	0.11
Total costs	3.44	2.68	4.12	2.24	4.23	2.69
ROA	0.89	0.62	0.79	0.70	0.35	0.89
Equity capitalization	6.00	4.11	6.16	4.65	4.58	4.68
Operating income ratios						
Interest margin	74.4	71.8	69.0	75.2	53.7	72.6
Noninterest income	25.6	28.2	31.0	24.8	46.3	27.4
Operating costs	68.1	64.8	66.8	71.8	67.9	72.1
Loss provisions	11.3	16.4	17.1	4.4	24.5	3.1
Total costs	79.4	81.2	83.9	76.2	92.4	75.1
Profit ratio	20.6	18.8	16.1	23.8	7.6	24.9
Operating equity ratios						
Gross income	72.2	80.3	79.7	63.2	100.0	76.5
Total costs	57.3	65.2	66.9	48.2	92.4	57.5
ROE	14.8	15.1	12.8	15.1	7.6	19.0

acting as stockbrokers as well as issuing and underwriting houses in the securities markets. The implication of offering a more extensive range of financial services is that customers have less need to maintain separate account facilities with independent stockbrokers, mutual funds or money market mutual funds as in the United States. German banks may benefit from both economies of scale and scope.

In the United States, the advent of mortgage securitization has a large potential impact on bank operating ratios. Traditionally, mortgage business has been a low margin, large value noncorporate line of business that helped lower operating ratios, while making a significant contribution to profits, especially if banks were able to avoid losses from interest rate mismatching and loan defaults. Mortgage securitization removes low margin, large value business from bank balance sheets and also generates hefty origination and servicing fees that tend to inflate noninterest income. Operating ratios for a bank that engages in mortgage origination and securitization are therefore raised on two grounds: first, because the mix of business that is reported on the balance sheet is tilted towards high margin business and, second, because noninterest operating costs and revenues are higher for a given asset base.

Mortgage-backed securities in the United States passed the 1 trillion dollar mark in September 1990 and now represent 40% of all residential mortgages. Whether the growth of mortgage securitization explains the higher operating ratios of American banks is difficult to say. It should, however, be noted that the potential impact of securitization on operating ratios is weakened by the fact that commercial banks hold between 15% and 20% of outstanding mortgage-backed securities.

Accounting differences may also contribute to the lower ratios reported by German banks. For instance, German banks make use of hidden reserves, which may result in an understatement of reported profits and equity. Moreover, their fixed assets and holdings of securities are reported at cost or market value, which also understates both equity and total assets. On the other hand, German banks report on their balance sheet pension and depreciation reserves, which tend to overstate total assets.

If the large German banks have hidden reserves that are equal to half their reported equity and if they maintain hidden reserves at a constant fraction of equity, then their true equity would be 7.02%, instead of 4.68%, of assets and their ROA would be 1.33% rather than 0.89%. The difference of 0.44% would represent the average annual transfer to hidden reserves. Assuming that this is split equally between an understatement of net interest revenues and an overstatement of noninterest expenses, the gross margin would be higher than reported at 3.80%, but the ratio of total operating costs to assets would be lower at 2.47%. Thus, the use of hidden reserves is likely to understate the operating performance of German banks, although under the assumptions used their reported ROE would be the same as the true ROE.

The balance sheet and income statement of German banks would also need to be adjusted for the pension and depreciation reserves that are carried on the balance sheet. If total assets are overstated by 15%, then their effective gross margin would be 4.37%, their total cost ratio 2.84% and their ROA 1.53%. But as their effective equity capitalization ratio would also rise to 8.08%, their ROE on equity would still be equal to

19%. It is interesting that these adjustments bring the gross margin of the big German banks much closer to that of the big American money center banks, although their operating costs are still significantly lower. Moreover, their superior loan loss experience would be totally unaffected by these adjustments.

Of course, it is very difficult, if not impossible, to tell how realistic are the assumptions that hidden reserves represent half the reported equity of German banks and pension and depreciation reserves overstate assets by 15%. However, these assumptions provide an indication of the orders of magnitude involved if the differences in operating performance between German and American banks are to be explained by differences in accounting practices.

Before concluding this section it is worth noting that loss provisions amounted to 24.5% of the equity of American money center banks. These are five-year averages, which suggests that either American banks have weak credit departments or competition is causing a deterioration of credit standards. The operating margins of money center banks are quite strong, implying that a return to sounder loan books and more normal levels of provisioning could lift their ROEs back to very respectable levels.

4.3 Differences between UK Commercial Banks and Building Societies

The difference in operating ratios between the large UK commercial banks and the building societies (Table 20) is interesting because it is unlikely to be caused by differences in accounting conventions or capital structure. Both groups of institutions follow broadly similar accounting rules, while their equity capitalization ratios are not very dissimilar - 5.03% for the commercial banks against 4.29% for the building societies. Thus, the differences in operating ratios and performance can be largely explained by differences in business mix or in operating efficiency.

As already remarked above, building societies are extremely efficient institutions. They have cost/income ratios of less than 50% and a gross margin of only 2.40%, while both their ROA and ROE are very high at 1.25% and 29% respectively. These are among the best ratios reported by any group of institutions reviewed in this paper. The secret for their success appears to lie in their specialization in a market with a strong demand for a proven product and in their ability to offer a simple range of ancillary services that complement their main product. Although societies have met increasing competition from commercial banks and specialized mortgage corporations in the UK market, they have been able to hold onto their dominant market share.

Building societies have long offered some basic payment services attached to passbook savings accounts, but they have not been burdened with the offer of labor-intensive checking account services. In recent years they have expanded their payment facilities, introducing a full range of card-based and checking account services, but their share of the market for household payment services is still small and they do not have to incur the operating costs of servicing large numbers of merchants and retailers as do the commercial banks. In recent years, building societies have diversified into other fields, such as limited consumer credit and commercial lending, insurance brokerage and

Table 20

Operating Ratios of UK commercial banks and building societies

	1985-89	
	Commercial Banks	Building Societies
Operating asset ratios		
Interest margin	3.21	2.04
Noninterest income	1.71	0.36
Gross income	4.92	2.40
Operating costs	3.27	1.15
Loss provisions	0.81	--
Total costs	4.08	1.15
ROA	0.84	1.25
Equity capitalization	5.03	4.29
Operating income ratios		
Interest margin	65.2	85.0
Noninterest income	34.8	15.0
Operating costs	66.5	47.9
Loss provisions	16.5	--
Total costs	82.9	47.9
Profit ratio	17.1	52.1
Operating equity ratios		
Gross income	97.8	55.9
Total costs	81.1	26.8
ROE	16.7	29.1

underwriting, and real estate agency business. The larger societies have taken advantage of expansion opportunities in continental Europe, especially in countries with less developed housing finance markets, such as Italy, Spain and France.

Because of their diversification into high margin business, they have been able to increase their overall margins. However, these developments in their business mix are likely to increase their operating cost ratios, while their remarkable record of low loan losses may also be marred, especially if they are forced to lower their credit and prudential standards.

The high operating ratios of the large UK commercial banks, effectively the large four clearing banks, can be explained, largely but perhaps not fully, by their rather unique product mix. Historically, the UK clearing banks have specialized in providing short-term, self-liquidating loans. They have not engaged in medium and long-term lending to industry or in providing mortgage finance to their personal customers. Despite building very large branch networks, their share of household deposits and household loans has been low.

Their reluctance to engage in mortgage lending was premised on the adage that it is imprudent to "borrow short and lend long". Since the mid-1970s, the clearing banks have changed their approach to term lending, first by providing variable-rate medium-term loans to industrial and commercial companies and then by engaging on a large scale in variable-rate housing finance. However, residential mortgages still represented less than 11% of total domestic assets in 1989.

Apart from focussing on short-term, high margin business, the UK clearing banks have also specialized in operating a nationwide paper-based payment and clearing system. This has taken longer to automate and replace with electronic payments than the payment systems of other European countries (electronic payments now represent about 25% of all noncash payments - well below the levels achieved in Germany, the Netherlands and Japan though well above the United States). In addition to offering extensive payment services and operating the clearing system on their own with little operational involvement from the Bank of England, the UK clearing banks have also provided extensive and labor-intensive services in foreign exchange related business, including export/import documentary credits. Thus, the high operating ratios of the large UK commercial banks are a direct result of the high margin/low asset value business mix.

Nevertheless, their involvement in high margin business may not explain fully the persistence of their high operating ratios. The UK clearing banks have been impeded in their efforts to automate and modernize their operations by the sheer scale of their branch networks and staff levels. With an average of 3,000 branches and well over 60,000 staff complements, their plans to computerize their service delivery systems have involved much greater capital outlays, more extensive retraining and greater dislocation of management practices than for banks in most other countries. In contrast, the building societies have expanded their networks in the 1960s and 1970s and have been able to implement automation plans more effectively.

4.4 Implications for Developing Countries

As already noted in the introduction of this paper, banks in developing countries generally operate with wide interest spreads. High spreads may be caused by government regulations (such as onerous reserve requirements and other forms of bank taxation), high inflation, high loan losses and high costs and profits due to operating inefficiencies and uncompetitive behavior. A detailed examination of bank operating ratios in developing countries is beyond the scope of this paper[6]. However, the discussion of these issues for banks in developed countries has a number of implications for analyzing bank operating ratios in developing countries.

The first concerns the comparability of operating cost data across banks that offer substantially different types of services. Business or product mix is one of the most important determinants of bank ratios[7]. Banks in developing countries generally offer a narrower range of services at a lower level of quality. Allowing for this, and the fact that labor costs are also generally lower in such countries, both their cost/asset and cost/income ratios should be smaller than those of banks in developed countries that provide a wider range of services of higher quality.

However, the data contained in Hanson and Rocha show that there are very few developing countries where cost/asset ratios are lower than those of developed countries. One example is Malaysia where commercial banks are reported to have a cost/asset ratio of around 1.3% (Hanson and Rocha, p. 25). Banks in most other developing countries operate with cost/asset ratios of between 2.0 and 3.5%, except for high inflation countries where cost ratios are well in excess of 4%.

The point of this analysis is that even a cost/asset ratio of 2% to 3% may be too high given the narrow range and low quality of services offered by banks in developing countries. The relatively high costs may be explained by operating inefficiencies (e.g. limited use of modern technology), by induced overstaffing or by the operation of too many uneconomic branches. The reasons may vary from country to country but the fact remains that the operating ratios of commercial banks in developing countries should be compared with banks that offer a broadly similar range of services.

The second major implication concerns the impact of inflation. Banks operating in countries that suffer from high inflation exhibit very high margins and cost ratios. As discussed in Hanson and Rocha (p 11), there are three reasons for this. First, banks employ more staff because of the increased volume of paperwork. Second, chronic inflation may lead banks to compete for low cost deposits by expanding their branch networks. Third, inflation may cause bank disintermediation which lowers the real value of assets while operating costs may rise. Disintermediation also affects bank operating cost

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[6] Hanson and Rocha (1986) provide a comprehensive analysis of bank spreads and intermediation costs in 16 developing and 10 developed countries.

[7] The importance of product mix is highlighted in Hunter and Timme (1990), who discuss changes in employment patterns among the world's largest banks.

ratios by affecting the capital structure of banks. Under high inflation, the replacement value of fixed assets prevents the erosion of bank equity capital and leads to a big increase in the equity capitalization ratio of banks. But the "free equity" of banks would be eroded under high inflation so that banks may earn very high spreads in nominal terms but achieve a very low and sometimes negative real ROE.

The third implication concerns the impact of loan provisioning policies. As noted above, banks in some European countries are allowed by their supervisory authorities to maintain hidden reserves. The impact of hidden reserves on bank profitability and operating ratios depends on whether they are used to smooth out fluctuations in annual profits or to build up a hidden source of capital. In developing countries, the problem is usually one of hidden losses rather than of hidden reserves. Failure to provide adequately for nonperforming loans and to write off loan losses is a widespread problem among banks in developing countries. In some countries, making proper allowance for such provisions may wipe out completely not only the annual profits of banks but also their entire equity capital. In some countries, nonperforming loans may be several times reported bank equity (World Bank, 1990a, p. 53).

In conclusion, a main argument of this paper is that comparing bank performance among banks from different countries, especially across developed and developing countries, is fraught with great difficulties. Considerable care must be taken to allow for differences in product mix, capital structure, accounting conventions and especially inflation rates before drawing firm conclusions. The use of standardized ratios can be helpful in highlighting unusual patterns but such ratios cannot substitute for detailed knowledge and understanding of local conditions and practices.

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